

## Claims

What is claimed is:

1. An apparatus for coating an article by immersion of the article in a fluidized powder, the apparatus comprising:

a container defining an interior and a plate separating the interior into a coating chamber and a plenum, the plate perforated by a plurality of pores to provide for passage of a gas from the plenum to the coating chamber;

a gas supply system connected to the plenum of the container for delivery of a gas to the plenum in a sufficient quantity to suspend a powdered material in the coating chamber in a fluidized volume;

the gas supply system having a controllable supply portion including a valve, the valve having opened and closed conditions to provide for intermittent delivery of gas to the plenum and a corresponding variation in the fluidized powder volume; and

a controller connected to the valve for controlling actuation of the valve between its opened and closed conditions.

2. The apparatus according to claim 1, wherein the gas provided by the controllable supply portion is compressed air.

3. The apparatus according to claim 2, wherein the valve is a solenoid valve and wherein the controller for the solenoid valve comprises a timer.

4. The apparatus according to claim 3, wherein the gas supply system further includes a blower connected to the plenum of the container for providing a primary supply of air that is supplemented by the controllable supply portion, the blower capable of substantially continuous delivery of air to the plenum in a quantity sufficient to suspend the powdered material in the coating chamber in a fluidized volume.

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5. The apparatus according to claim 4, wherein the gas supply system further includes a check valve between the blower and the plenum to prevent passage therebetween of compressed air from the controllable gas supply.

6. The apparatus according to claim 2, wherein the gas supply system includes a pressure regulator for controlling the pressure of the compressed air delivered to the plenum.

7. The apparatus according to claim 1 wherein the controller for controlling the valve of the gas supply system comprises a limit switch.

8. An apparatus for coating an article by immersion of the article in a powdered material suspended in a fluidized condition, the apparatus comprising:

a container defining an interior and including a divider extending across the interior to separate the interior into an upper coating chamber and a lower plenum, the divider perforated by a plurality of pores for passage of a gas from the plenum to the coating chamber;

a gas supply system including first and second portions each connected to the plenum, the first portion capable of a substantially continuous delivery of a gas in a sufficient quantity for suspension of a powdered material in the coating chamber in a fluidized volume,

the second portion of the gas supply system providing a controllable supply of gas capable of delivery of discontinuous pulses, the pulses supplementing the fluidizing gas delivered by the first portion.

9. The apparatus according to claim 8, wherein the gas delivered by the second portion of the gas supply system is compressed air.

10. The apparatus according to claim 9, wherein the second portion of the gas supply system includes a control system for cyclically controlling the compressed air pulses delivered to the plenum.

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11. The apparatus according to claim 10, wherein the second portion of the gas supply system includes a pressure regulator for variably controlling the pressure of the compressed air pulses.

12. The apparatus according to claim 10, wherein the second portion of the gas supply system includes a solenoid valve capable of being actuated between opened and closed conditions for respectively enabling and disabling delivery of the compressed air.

13. The apparatus according to claim 12, wherein the second portion of the gas supply system includes a timer operably connected to the solenoid valve, the timer controlling the actuation of the solenoid valve for variable control of the duration of the pulses of compressed air.

14. The apparatus according to claim 13, wherein the timer is capable of variably controlling both the duration and the frequency of the compressed air pulses to provide for first and second modes of operation, the first mode delivering pulses resulting in variation in the fluidized volume, the second mode delivering relatively long pulses with respect to the first mode pulses to promote powder mixing.

15. The apparatus according to claim 12, wherein the second portion of the gas supply system includes a limit switch operably connected to the solenoid valve for controlling the actuation of the solenoid valve.

16. The apparatus according to claim 13, wherein the second portion of the gas supply system includes a limit switch operably connected to the timer for alternately enabling and disabling the timer from controlling the solenoid valve, the second portion of the gas supply system further including a second solenoid valve and a second timer operably connected to the second solenoid valve for controlling the actuation of the second solenoid valve.

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17. The apparatus according to claim 11, wherein the first portion of the gas supply system includes a blower.

18. The apparatus according to claim 17, wherein the gas supply system further includes a check valve between the container and the blower to prevent passage therebetween of compressed air from the second portion.

19. A method of coating an article in a coating chamber containing a powder suspended in fluidized state, the method including the steps of:

providing a controllable supply of gas operably connected to a coating chamber for intermittent delivery of gas to the coating chamber and a corresponding variation in a fluidized volume occupied by a powder therein;

controlling the controllable supply for an intermittent delivery of gas and a corresponding variation in the fluidized volume; and

immersing at least a portion of an article into the fluidized powder while the controllable supply of gas is being controlled to vary the fluidized powder volume.

20. A method of coating an article in a coating chamber containing a powder suspended in a fluidized state, the method including the steps of:

providing a primary supply of gas operably connected to a coating chamber for substantially continuous delivery of gas to the coating chamber in a sufficient quantity for suspending a powdered coating material in the coating chamber in a fluidized volume;

providing a controllable supply of gas operably connected to a coating chamber for intermittent delivery of gas to the coating chamber;

delivering gas from the primary supply to suspend a powdered coating material in the coating chamber in a fluidized volume;

delivering gas from the controllable supply of gas.

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21. The method according to claim 20, including the further steps of:  
controlling the gas from the controllable supply of gas such that the fluidized volume is cyclically varied;  
immersing at least a portion of an article into the fluidized powder while the fluidized volume is being varied; and  
removing the article from the fluidized powder.

22. The method according to claim 20, including the further steps of:  
controlling the gas from the controllable supply of gas such that relatively long duration pulses of gas are directed to the coating chamber to facilitate mixing of the suspended material.